Preparation of Glass Diaphragms for the Inlet System of Mass Spectrometer.

small hole is made with a hot needle (Fig.1). On either side of the film cover are fixed electrodes connected to an induction coil. By electrolysis in the usual way, a potential difference of 25 volts is applied from a bank of condensers, giving a capacity of 10.0 microfarads. When the coil is switched on, the small, round aperture 15 μ in diameter is enlarged in the centre. The diameter can be increased to 50 μ if the diaphragm is repeated several times. In order to obtain bigger diameters fluoric acid may be applied by means of the apparatus. Diameters of 100 to 500 μ can be obtained in this way. The diaphragm may be fused into the inlet system of the mass spectrometer as shown in Fig.2. V.L. Talrose collaborated. There are 2 diagrams, no tables and 2 Russian references.

ASSOCIATION: Institute of Chemical Physics of the Academy of Sciences of the USSR. (Institut khimicheskoy fiziki AN USSR)

SUBMITTED: February 5, 1957.

AVAILABLE: Library of Congress.

1. Spectrometers 2. Diaphragms-Glass-Application

KUDRYAKOV, A. A., kand. veterinarnykh nauk; ALEKSEYEVA, O.P., nauchnyy sotrudnik

Determining the antibiotic susceptibility of Salmonella strains isolated from animals. Veterinariia 38 no.6:85 Je '61. (MIRA 16:6)

1. Vologodskaya nauchno-issledovatel'skaya veterinarnaya stantsiya. (Salmonella) (Antibiotics)

KUDRYAKOV, A. A., BEZMITKOVA, O. YE., Authors

GAERTNER'S BACILLUS

Development of filtrable forms of Gaertner's bacillus from old bouillon cultures. Veterinariia 29 no. 9, 1952.

Vologodskaya Oblast' Veterinaro-Bacteriological Lab., RSFSR

Monthly List of Russian Accessions. Library of Congress. November 1952. UNCLASSIFIED.

KUDRYAKOV, A. A.

USSR/Diseases of Farm Animals. Diseases Caused by Bacteria and Fungi.

Abs Jour: Ref Zhur-Biol., No 3, 1958, 12247.

Author : Kudryakov, A. A.
Inst : Vologda Scientific Research Veterinary Test Station
Title : The Precipitation Reaction as a Method of Diagnosing Brucellosis Abortions.

Orig Pub: Sb. rabot Vologod. n.-i. vet. opytn. st., 1956, vyp. 3, 5-11.

Abstract: Precipitinogens were prepared from the liver, the spleen and the abomasum content of the aborted fetus according to the method of Pflueger as modified by B. G. Bazilevskiy and V. A. Mel'nik in order to obtain glycogen from the liver. The antiserum was obtained by using live brucelli cultures or the complete bru-

Card : 1/2

USSR/Diseases of Farm Animals Diseases Caused by Bacteria and Fungi.

Abs Jour: Ref Zhur-Biol., No 3, 1958, 12247.

celli antigens - polysaccharide-lipoid, a complex derived from virulent strains of Brucella bovis and Br. melitensis. The precipitation reaction (PR) was made according to the usual methods. Precipitinogen prepared from the abomasum content of the aborted fetus proved to be the most precise. The PR indicators with this precipitinogen concurred with the results of biological tests on mice in 97.1 percent of the cases. The author is of the opinion that PR with brucellosis precipitating antisera and precipitinogens is active and specific, and can be used successfully in brucellosis examinations of aborted fetuses.

Card : 2/2

KUDRYAKOV, A. A. Cand Vet Sci -- (diss) "The Precipitation Reaction as a Method of [illegible] Diagnosing Brucellosis Abortions." Vologda, 1957. 14 pp 20 cm. (Min of Agriculture USSR, Len Veterinary Inst), 110 copies (KL, 26-57, 111)

KUDRYAKOV, A.A.

Antibiotic treatment of brucellar postabortal complications in cows. Veterinariia 35 no.12:45-47 D '58. (MIRA 11:12)

1. Direktor Vologodskoy nauchno-issledovatel'skoy veterinarnoy stantsii.
(Brucellosis in cattle) (Antibiotics)

KUDRYAKOV, A. A., and ALEKSEYEVA, O. P. (Scientific Co-Worker)

"Determination of the response of Salmonella strains, isolated from Animals, to Antibiotics."

Veterinariya, Vol. 38, No. 6, 1961. p. 85

Kudryakov, A. A. - Candidate of Veterinary Sciences. Vo[redacted].

KUDRYAKOV, A.A.

Vologda Veterinary Research Institute. Trudy VIEV 23:365-366 '59.
(MIRA 13:10)

(Vologda--Veterinary research)

KUDRYAKOV, A. A. (Director of the Vologda NIVS)

"Characteristics of the RA and RSK in cattle infected with brucellosis and treated with antibiotics"

Veterinariya, Vol. 38, no. 10, October 1961, pp. 81-89

(N) L 1710-66 EWT(d)/EPA(s)-2/EWP(v)/T/EWP(t)/EWP(k)/EWP(h)/EWP(b)/EWP(l)/EWA(c) JD/HM

ACCESSION NR: AP5021953 UR/0193/65/000/008/0022/0023
621.791.75-52

AUTHOR: Kudryakov, G. M. 44,55

TITLE: Experience in introducing automatic multielectrode butt welding

SOURCE: Byulleten' tekhniko-ekonomicheskoy informatsii, no. 8, 1965, 22-23

TOPIC TAGS: welding electrode, butt welding, automatic welding, arc welding, metal welding/ DTS-24 automatic twin-arc welding machine

ABSTRACT: It is not feasible to obtain butt joints with weld width exceeding 30 mm and height of more than 3 mm by means of single-pass automatic submerged-arc welding, particularly when austenitic weld material is used. In such cases the required weld dimensions are assured by means of automatic multipass welding. To reduce the labor requirement and duration of the automatic multipass butt welding in such cases, the Krasnoye Sormovo Plant has introduced a new highly productive method -- multielectrode welding by two separately powered weld arcs simultaneously extended along the weld axis (Fig. 1), one burning between the product and a wire electrode and the other, between the product and a split electrode.

Card 1/3

L 1710-66

ACCESSION NR: AP5021953

This type of welding is performed with the aid of the DTS-24 modernized twin-arc welding machine. The economic indicators of multielectrode welding of one running meter of butt joint (weld thickness 36 mm), compared with the previously used method, are as follows: number of welding passes, 14 instead of 38; cross sectional area per pass, 135 mm^2 instead of 50 mm^2; flux consumption, 10.5 kg instead of 19 kg; labor requirement, 1.9 instead of 5.4 man-hours. Thus, the introduction of multielectrode automatic butt welding has increased labor productivity two to two and one-half times as compared with single-electrode welding. Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 01 SUB CODE: IE, MM

NO REF SOV: 000 OTHER: 000

Card 2/3

L 1710-66

ACCESSION NR: AP5021953 ENCLOSURE: 01

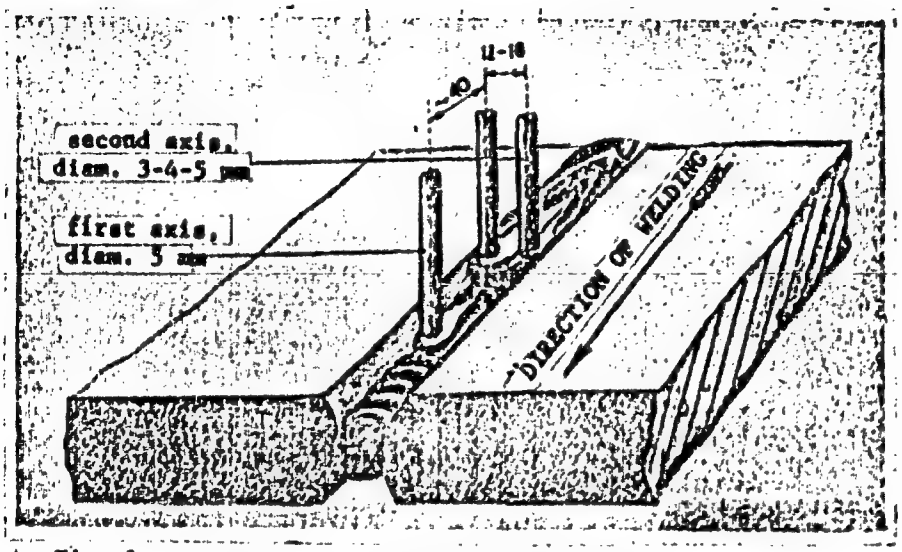

Fig. 1. Diagram of multielectrode welding

Card 3/3

KUDRYAKOV, I.

Tickets for the shipment and intake of goods. Bukhg.uchet 14 no.6:48-49 Je '57. (MLRA 10:7)
(Factories--Accounting)

SOV/137-58-8-16262

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 8, p 4 (USSR)

AUTHOR: Kudryakov, I.I.

TITLE: Dressing Pikalevo Limestone as a Blast-furnace Flux (Obogashcheniye izvestnyaka Pikalevskogo mestorozhdeniya kak flyusa dlya domennoy plavki)

PERIODICAL: [Tr.] Vses. n.-i. i proyektn. in-ta mekhan. obrabotki poleznykh iskopayemykh, 1957, Nr 102, pp 283-285

ABSTRACT: It is proposed to separate this limestone by gravitation, making use of the differences in the volumetric weights of the hard and soft varieties. The following process procedure is recommended: coarse crushing to 200-0 mm with supplementary screening; screening of the first crushing products to 200-80, 80-25, and 25-0 mm classes; picking the 200-80 and 80-85 (sic!) mm classes (removal of silicon); medium crushing of the 80-mm oversize on a hammer crusher (to 80-0 mm); screening the crushing products to the 80-25 mm class(marketable class) and 25-0 mm (fines and tailings); gravitational dressing: jigging or sink-float separation.

Card 1/1 1. Calcite--Processing

A.Sh.

KUDRYAKOV, M.N.

UKB-3,6 machinery for shaft boring in hard rock. Shakht.stroi. no.1:14-17 Ja '57. (MLRA 10:7)
(Shaft sinking) (Rock drills)

KUDRYAKOV, M.N., inzh.; LITVIN, A.Z., inzh.; OSIPOV, A.M., inzh.

Boring nine shafts in Holland. Shakht. stroi. no.2:31-32 3 of cover '58. (MIRA 11:3)

(Netherlands--Shaft sinking) (Boring)

KUDRYAKOV, A.M.

LITVIN, A.Z., inzh.; KUDRYAKOV, A.M., inzh.; OSIPOV, A.N., inzh.

Lining the "Beatrix" mine shaft in Holland. Shakht. stroi. no.3:32-33 '58. (MIRA 11:3)

(Netherlands--Shaft sinking)

KUDRYAKOV, M.N., insh.; BRAUN, I.V., insh.

Result of service testing of UKB-3, 6. Shakht. stroi. no.6:14-17 '58. (MIRA 11:6)

1.Giproshakhtostroymash.
(Boring machinery--Testing)

KUDRYAKOV, M.N., inzh.

Prospects for the development of the combination drilling of shafts with a large diameter. Shakht.stroi. 6 no.11:9-13 N '62. (MIRA 15:12)

1. TSentral'nyy nauchno-issledovatel'skiy i proyektno-konstruktorskiy institut podzemnogo shakhtnogo stroitel'stva.
(Shaft sinking)

NIKITINA, N., inzh.; KUDRYAKOV, V., inzh.

New building materials made with plastics. Pozh.delo 8 no.5:6-7 My '62. (MIRA 15:5)
(Building materials—Testing) (Plastics)

KUDRYAKOV, V.A.

Piezometric minimums as a hydrogeological index of oil and gas potential. Neftegaz. geol. i geofiz. no.4:35-39 '64. (MIRA 17:6)

1. Moskovskiy ordena Trudovogo Krasnogo Znameni institut neftekhimicheskoy i gazovoy promyshlennosti im. akademika Gubkina.

KARTSEV, A.A.; KUDRYAKOV, V.A.; KHODZHAKULIYEV, Ya.A.

Basic characteristics of the hydrodynamics of the northern part of the Kara Kum artesian basin. Dokl. AN SSSR 157 no.5:1114-1117 Ag '64. (MIRA 17:9)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti im. Gubkina. Predstavleno akademikom D.I. Shcherbakovym.

KUDRYAKOV, Ya.

Technical servicing of ships. Rech. transp. 24 no.5:33-34 '65.
(MIRA 18:9)

1. Mekhanik-nastavnik Volgogradskogo beregovogo proizvodstvennogo uchastka, Volgogradskiy port.

KUDRYAKOVA, N. A.

36238

KUDRYAKOVA, N. A. I SOKOLOV, A. S.
Opredeleniye shtapel'nogo volokna. Tekstil. Prom-st', 1949, No. 11, s. 14-16

SO: Letopis' Zhurnal'nykh Statey, No. 49, 1949

BRUSILOVSKAYA, V.A.; KUDRYAKOVA, N.A.

Electromagnetic counter of the number of warp yarn breakages.
Obm.tekh.opyt. [MLP] no.15:29-31 '56. (MIRA 11:11)
(Looms) (Counting devices)

KUDRYAKOVA, N.A.; BRUSILOVSKAYA, V.A.; BULAYEVA, A.M.; DENISOVA, V.A.; KAPOROVA, A.V.

Strengthen the role of the plant laboratory. Tekst. prom. 17 no.3: 53 Mr '57. (MLRA 10:4)

(Textile research)

KUDRYAKOVA, N.A.; BRUSILOVSKAYA, V.A.; BULAYEVA, A.M.

Reorganizing laboratory work. Tekst. prom. 17 no.8:44-45 Ag '57.
(Textile industry--Quality control) (MLRA 10:9)

KUDRYAKOVA, N.A.

BRUSILOVSKAYA, V.A.; KUDRYAKOVA, N.A.

Read clearing device. Tekst.prom. 18 no.4:61 Ap '58. (MIRA 11:4)
(Silk manufacture) (Looms--Maintenance and repair)

KUDRYAKOVA, N.A.; BRUSILOVSKAYA, V.A., inzh.

Effectiveness of the new control method. Tekst. prom. 19 no.6:69-70 Je '59. (MIRA 12:9)

1.Zav. laboratoriyey Nare-Fominskoy fabriki (for Kudryakova).
(Textile factories--Quality control)

KUDRYAKOVA, N. I.

Removal of chlorite and sericite from sulphide concentrates.
Trudy Mekhanobr no. 131:202-207 '62. (MIRA 17:5)

AUTHORS: Godovikov, A.A. and Kudryakova, V.A. SOV-11-58-10-3/12

TITLE: The Specific Nature of the Oxidation Process of Smaltite-Chloanthite (O rekotorykh osobennostyakh protsessa okisleniya shmaltin-khloantita)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geologicheskaya, 1958, Nr 10, p 37 - 44 (USSR)

ABSTRACT: One of the characteristic peculiarities of the smaltite-chloanthite mineral is its zonal structure. These zones differ from each other in chemical composition and in their content of cobalt and nickel. Only cobaltic arsenide (skutterudite) is a constant component of all zones. This opinion was long ago expressed by foreign scientists (Ref. 10, 11, 13 and 15) and is now confirmed by chemical tests (Table 2) and by X-ray examinations (Table 3) of thin sections of smaltite-chloantnite taken from the same deposit. The authors describe the procedure adapted for the chemical analyses. The following names are mentioned for work in this field. D.S. Lemmleyn, A.A. Ostroumov, and the chemist A.I. Pokrovskaya from the IGEM AS USSR. There are

Card 1/2

SOV-11-58-10-3/12

The Specific Nature of the Oxidation Process of Smaltite-Chloanthite

5 photos, 3 tables and 15 references, 8 of which are Soviet, 3 German, 2 French and 2 American.

SUBMITTED: April 23, 1957

ASSOCIATION: Institut mineralogii, geokhimii i kristallokhimii redkikh metallov AN SSSR, Moskva (The Institute of Mineralogy, Geochemistry and Crystallo-Chemistry of Rare Metals of the AS USSR, Moscow)

1. Minerals--Chemical analysis 2. Minerals--X-ray 3. Minerals --Oxidation

Card 2/2

S/169/62/000/008/047/090
E202/E192

AUTHOR: Kudryan', A.P.

TITLE: Certain features in the structure of clouds in "southern" cyclones

PERIODICAL: Referativnyy zhurnal, Geofizika, no.8, 1962, 47, abstract 8 B 320. (Tr. Odessk. gidrometeorol. in-ta, no.23, 1961, 57-61).

TEXT: Preliminary results are presented of studies on the structure and development of the As-Ns cloud systems over the coastal region of the N.W. part of the Black Sea during the southern cyclones, based on the data derived from temperature and wind soundings over Odessa and other meteorological data in that region during 1953-1960. Studies of dependence of cloudiness on the temperature distribution, moisture content and vertical movements were carried out for actual synoptic situations characterised by the passage of the frontal part of the cyclone, passage of the cold front and stationary filling up of the cyclones located not further than 300-400 km from the region under investigation. In the frontal part of the cyclone during

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transitional seasons and in winter, cirrus clouds have a vertical thickness reaching 1-2 km and are separated by a considerable interlayer from the As-Ns cloud system. The latter does not have a large horizontal spread (100-200 km) and is located directly over the ground line of the front, in the vicinity of which falls most of the precipitate. The approach of the warm front is heralded by the appearance of Ac clouds at a height of 2-4 km and As clouds at a height of 5-7 km. The structure of the cloud system of a warm front is to a large extent determined by the heterogeneity of heat and moisture advection at various altitudes. In the cold front, Cb is located in a more narrow zone than Ns is in the warm front. The structure of the cloud system of the cold front is largely determined by the formation of the divergence and convergence zones in the upper troposphere and correspondingly sharply defined anabatic and katabatic movements. Most prolonged precipitates are observed during stationary conditions or slow shift of quickly growing upwards cyclones; at the same time the value of the adjusted vertical movements at the height of 3-5 km does sometimes reach in such cyclones 150-200 mb/12 hours.

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Certain features in the structure.. S/169/62/000/008/047/090
E202/E192

Outside the fronts, cloud layers or layers with increased moisture content are located below the zones of the increased wind velocities, which is explained qualitatively by the divergence in the regions of maximal wind velocities and by compensating vertical movements.
2 references.

[Abstractor's note: Complete translation.]

Card 3/3

S/169/62/000/008/046/090
E202/E192

AUTHORS: Kudryan', A.P., and Zemlyakova, I.V.

TITLE: Influence of vertical movements on the evolution of frontal zone

PERIODICAL: Referativnyy zhurnal, Geofizika, no.8, 1962, 45, abstract 8 B 309. (Tr. Odessk. gidrometeorol. in-ta, no.23, 1961, 81-84).

TEXT: Studies on the nature of advection and vertical movements in four cases of transformation of altitudinal frontal zone (AFZ), having a zonal direction of contour line into the zone with sharply defined depression forming contours over Central Europe (January 24 and 25, April 8th 1959, and August 26, 1958) were carried out. Advective changes of temperature within 12 hours on the surfaces of 850, 700 and 500 mb. were determined graphically and the vertical movements calculated on the same surfaces according to the formulae of Dyubyuk-Lebedeva. In all four cases, the regions of advection of heat and cold are alternating along the stream. Advective warmings are accompanied by ascending

Card 1/2

movements and advective coolings by descending ones. In the region of cold advection, anabatic movements are observed near the zero line of temperature advection. In this part of AFZ are observed strong falls of temperature, as much due to advection as to the anabatic vertical movements, which result in strong deformation of the AFZ and pressure drop leading to the formation and growth of cyclones. The studies confirmed the presence of regions within the AFZ wherein are observed simultaneously anabatic movements and cold advection.

[Abstractor's note: Complete translation.]

Card 2/2

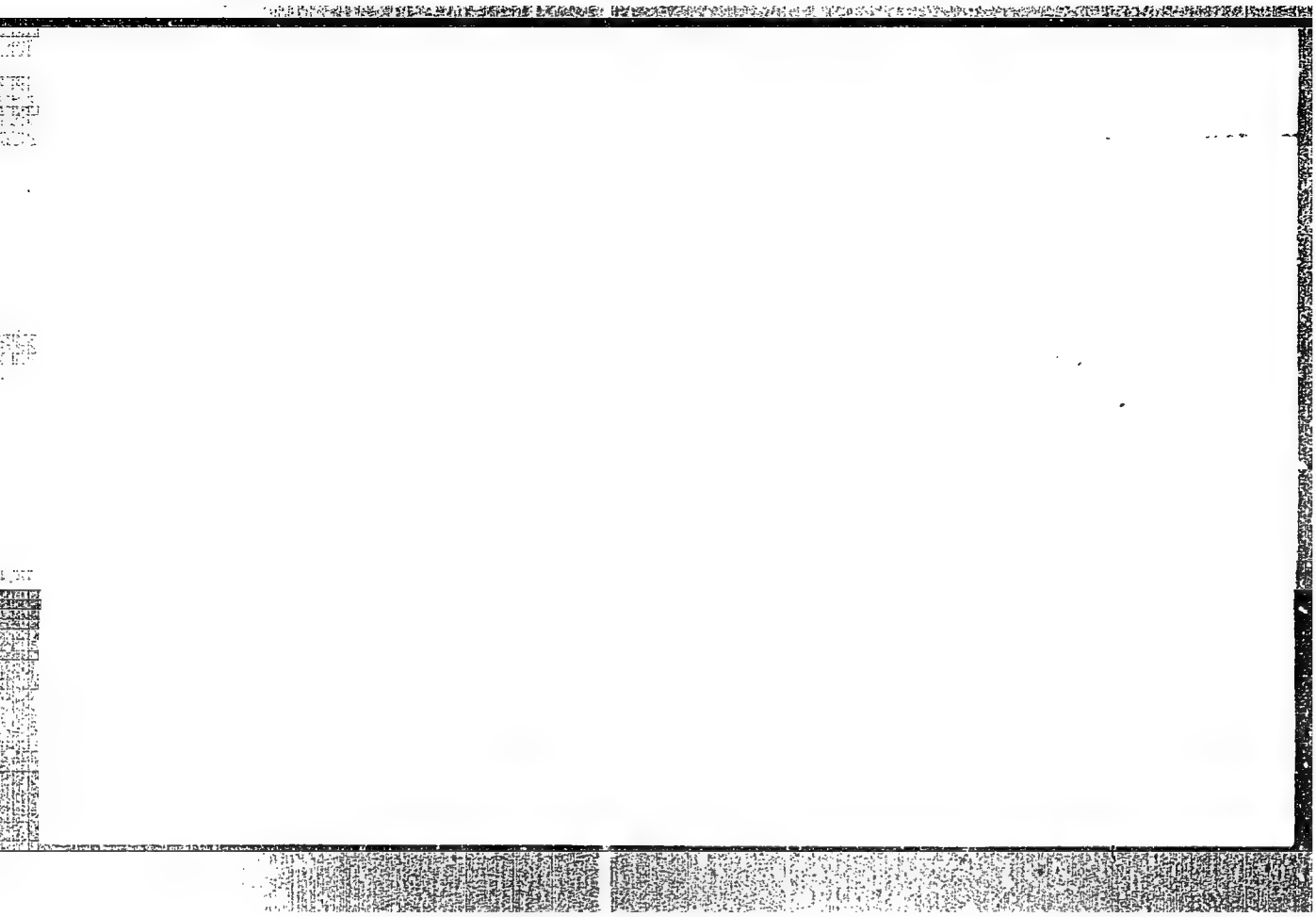
KUDRYASH, A.P., inzh.

Some problems of the performance of the 2D100 diesel engine in idle running. Trudy KHIIT no.46:141-145 '61. (MIRA 15:12)

1. Eksperimental'naya laboratoriya Khar'kovskogo zavoda transportnogo mashinostroyeniya imeni V.A.Malysheva.
(Diesel engines—Testing)

[illegible] [illegible]V, [illegible].F., Cand Tech Sci--([illegible]) "Ex[illegible] [illegible] study of the laws of river bed [illegible] on ~~eroded~~ washed-out [illegible]." L[illegible], 195[illegible]. 14 pp (Len Inst of Engineers of Water [illegible]), [illegible] copies (KL,22-5[illegible], 108)

— [illegible] —



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KUDRYASHEV, Gennadiy Mikhaylovich,;OVCHINNIKOV, Mikhail Nikiforovich,;
RUDNEV, G.V., otv.red.;ZHDANOVA, L.P., red.; SOLOVEYCHIK, A.A.,tekhn. red.

[Tables for the computation of soil moisture] Tablitsy dlia vychisleniia vlazhnosti pochvy. Leningrad, Gidrometeor. izd-vo, 1958. 483 p. (MIRA 11:12)
(Soil moisture--Tables,etc.)

KUDRYASHOV, G.N., inzhener; BITSYUTKO, Ya.S., inzhener.

Making road pavements from local materials. Avt. dor. 20 no.2:14-15 F '57. (MLRA 10:4)

(Polesye--Pavement)

BITSYUTKO, Ya.S., inzh.; KUDRYASHEV, G.N.

Pavements made of small plates. Avt.dor. 20 no.8:17 Ag '57.
(MIRA 12:4)

(Pavements, Concrete)

KUDRYASHEV, I.I.; BARANOV, A.T; ROZENFEL'D, L.M.; BORDYUG, D.Ya.; LEVIN, N.V.; KALNINA, N.A.; KAN, F.A.; VAS'YANOV, D.P., red.; KUZNETSOV, A.I., tekhn. red.

[Technical specifications for manufacturing articles from cellular concrete, foamed fly ash concrete, breeze foamed fly ash silicate, and foamed clinker concrete] Tekhnicheskie usloviia na izgotovlenie izdelii iz avtoklavnykh iacheistykh betonov - penozolobetona, penozolosilikata i penoshlakobetona; proekt. Moskva, TSentr. biuro tekhn. informatsii, 1959. 62 p. (MIRA 15:2)

1. Akademiya stroitel'stva i arkhitektury SSSR. Institut novykh stroitel'nykh materialov, otdelki i oborudovaniya zdaniy. 2. Nauchno-issledovatel'skiy institut novykh stroitel'nykh materialov Akademii stroitel'stva i arkhitektury SSSR (for Kudryashev). 3. Nauchno-issledovatel'skiy institut betona i zhelezobetona (for Baranov, Rozenfel'd). 4. Nauchno-issledovatel'skiy institut organizatsii, mekhanizatsii i tekhnicheskoy pomoshchi stroitel'stvu Akademii stroitel'stva i arkhitektury SSSR (for Bordyug, D.Ya.). 5. Nauchno-issledovatel'skiy institut promyshlennykh zdaniy i sooruzheniy (for Levin). 6. Zapadno-Sibirskiy filial Akademii stroitel'stva i arkhitektury SSSR (for Kalnina). 7. Ural'skiy filial Akademii stroitel'stva i arkhitektury SSSR (for Kan).

(Lightweight concrete)

MAKARICHEV, V.V., kand. tekhn. nauk; LEVIN, N.I., kand. tekhn.nauk; KUDRYASHEV, I.T., kand. tekhn. nauk, retsenzent [deceased]; RABINOVICH, A.I., kand. tekhn. nauk, retsenzent; GUSAKOV, V.N., kand. tekhn. nauk, retsenzent; GLOTOVA, L.V., red. izd-va; SHERSTNEVA, N.V., tekhn. red.

[Designing elements madeofcellular concrete] Raschet konstruktsii iz iacheistykh betonov. Moskva, Gos. izd-vo lit-ry po stroit., arkhit. i stroit. materialam, 1961. 153 p. (MIRA 14:9)
(Precast concrete)

RUDNYASHEV, K.P.

Statistical characteristics of the radio occultation of a cloudy atmosphere in the 0.8 cm. band. Radiotekh. i elektron. 10 no.12:2105-2112 D '65. (MIRA 19:1)

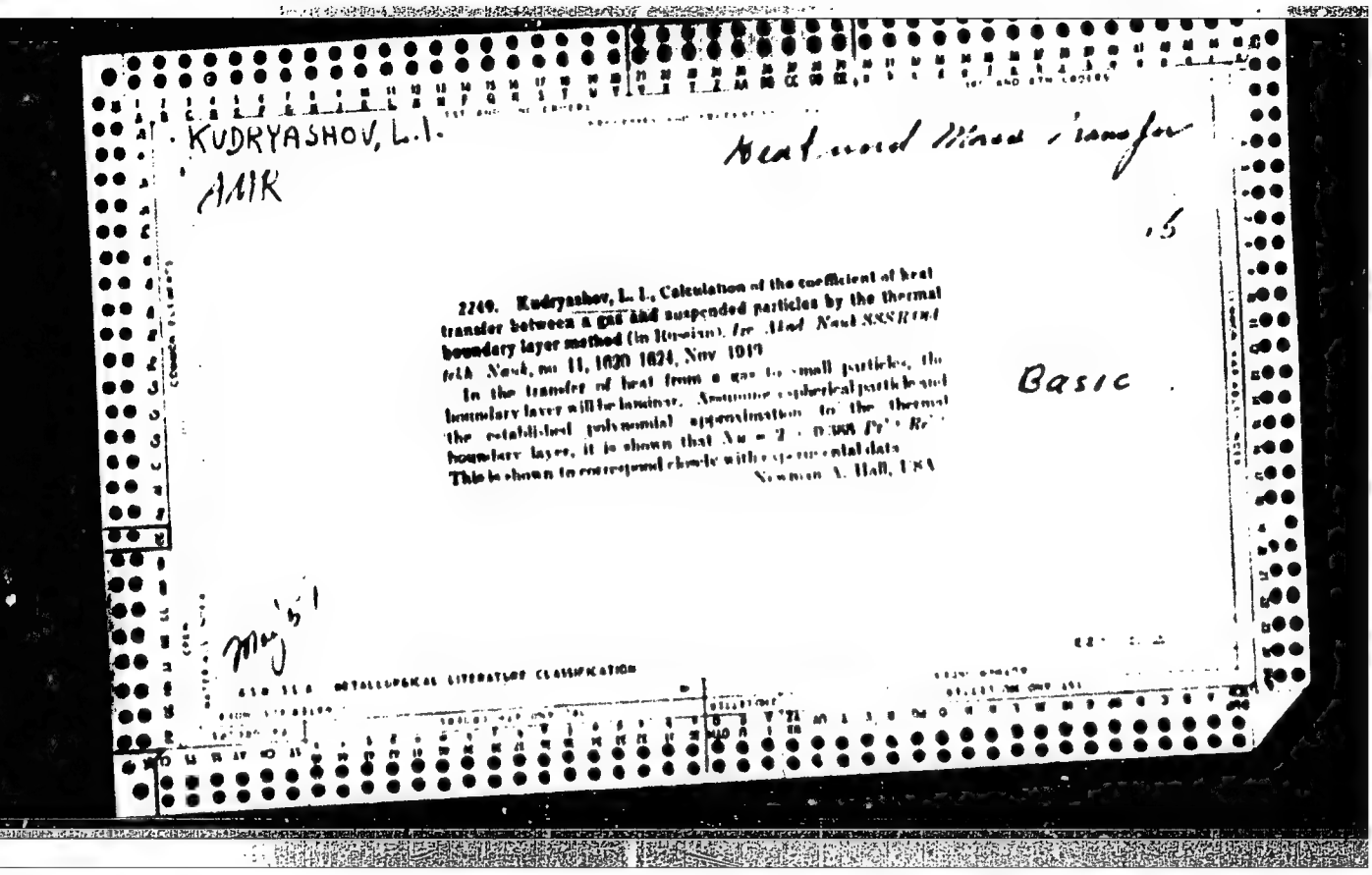
1. Submitted August 21, 1964.

[redacted], L. I.; [redacted], N. L.

"Approximate solutions of nonlinear, unsteady, heat-conduction problems by application of the integral relations of Academician L. S. Leybenzon."

report submitted for 2nd All-Union Conf on Heat & Mass Transfer, Minsk, 4-12 May 1964.

Kuybyshev Aviation Inst.



KUDRYASHOV, L.I.

AMR

Heat and Mass Transfer

15

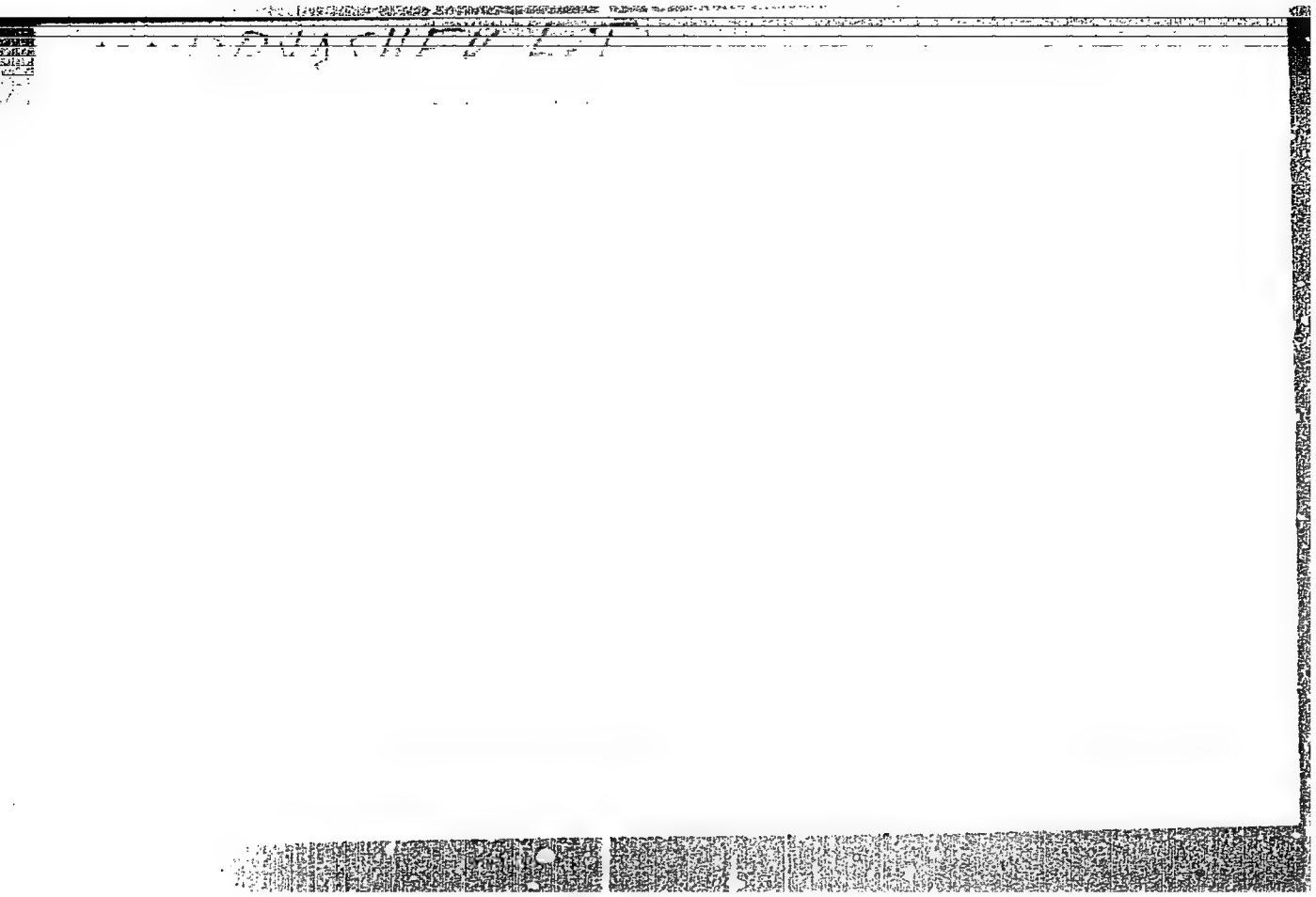
2249. Kudryashov, L. I., Calculation of the coefficient of heat transfer between a gas and suspended particles by the thermal boundary layer method (in Russian) *Izv. Akad. Nauk SSSR Otd. Tekh. Nauk*, no 11, 1020 1024, Nov 1949

In the transfer of heat from a gas to small particles, the boundary layer will be laminar. Assuming spherical particles and the established polynomial approximation to the thermal boundary layer, it is shown that $Nu = 2 + 0.395\ Pr^{1/3} Re^{1/2}$. This is shown to correspond closely with experimental data.

Norman A. Hall, USA

Basic

MetLit



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USSR/Physics - Heat, Transference Nov 49
Evaporation

"Obtaining a More Accurate Value of the Coefficient of Heat Exchange Between a Gas and Suspended Particles by Using the Thermal Boundary Layer Method," L. I. Kudryashev, Power Eng Inst imeni G. M. Krzhizhanovskiy, Acad Sci USSR, 6 pp

"Iz Ak Nauk SSSR, Otdel Tekh Nauk" No 11

Principle used to study evaporation process in dispersed liquid. Obtains equation Nu = 2+0.33 Re, giving values falling between those of

159276

USSR/Physics - Heat, Transference Nov 49
(Contd)

Processing and those of Lyakhovskiy. Submitted by Acad M. V. Kirpichev.

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KUDRYASHEV, L. I.

FA 159276

[illegible], [illegible]

"[illegible] of Evaporation of Atomic [illegible] Its [illegible] Evaporation [illegible] of [illegible]." Sub [illegible] 1, [illegible] Sci USSR.

Dissertations presented for science [illegible] 1.

SO: Sum. No. [illegible], [illegible] May 55.

USSR/ Engineering - Heat Engineering Feb 51

"Approximate Solution of the Problem on Heat Exchange Under Conditions of Free Motion of Liquid in the Case of a Laminar Boundary Layer Near the Wall," L. I. Kudryashev, Power Eng Inst imeni G. M. Krzhizhanovskiy, Acad Sci USSR

"Iz Ak Nauk, Otdel Tekh Nauk" No 2, pp 253-260

Theoretical soln, based on works by M. V. Kirpichev and his students, whose exptl data were processed by M. A. Mikheyev in his article "Heat Loss in Free Motion" ("Iz Ak Nauk,

185T43

USSR/Engineering - Heat Engineering Feb 51
(Contd)

Otdel Tekh Nauk" No 10, 1947), shows good agreement with exptl data. These works lead to assumption that phenomenon of convective heat exchange may be reduced to studying heat exchange in thin boundary layer. Presents simplified calcns of heat exchange parameters. Submitted by Acad M. V. Kirpichev.

185T43

USSR/Engineering - Heat Exchange Nov 51

"On Connection of Generalized Integral Ratios With the Hydrodynamic Theory of Heat Exchange and on Its Application to Calculation of Heat Exchange Under Conditions of the External Problem," L. I. Kudryashev

"Iz Ak Nauk SSSR, Otdel Tekh Nauk" No 11, pp 1682-1688

Establishes relation of generalized integral ratios for hydrodynamic and thermal boundary layers in cases of turbulent or laminar motions with hydrodynamic theory of heat exchange. Use

199T69

USSR/Engineering - Heat Exchange Nov 51
(Contd)

of this relation permits calcn of heat exchange coeffs in case of flow around plane plate with any law of distribution of velocities and excessive temps in boundary layer. Submitted by Acad M. V. Kirpichev.

199T69

USSR/Engineering - Heat Engineering, Dec 51
Drying

"Rated Temperature Difference in Evaporating and Drying Installations Operated by Principle of Spraying," L. I. Kudryashev

"Iz Ak Nauk SSSR, Otdel Tekh Nauk" No 12, pp 1812-1824

Discusses theoretical premises for solving problem of rated temp difference at small spraying coeffs, not over 0.2, which are most characteristic of installations using spraying action. Suggests isothermal drying or evaporating process never mentioned in tech publications. Process

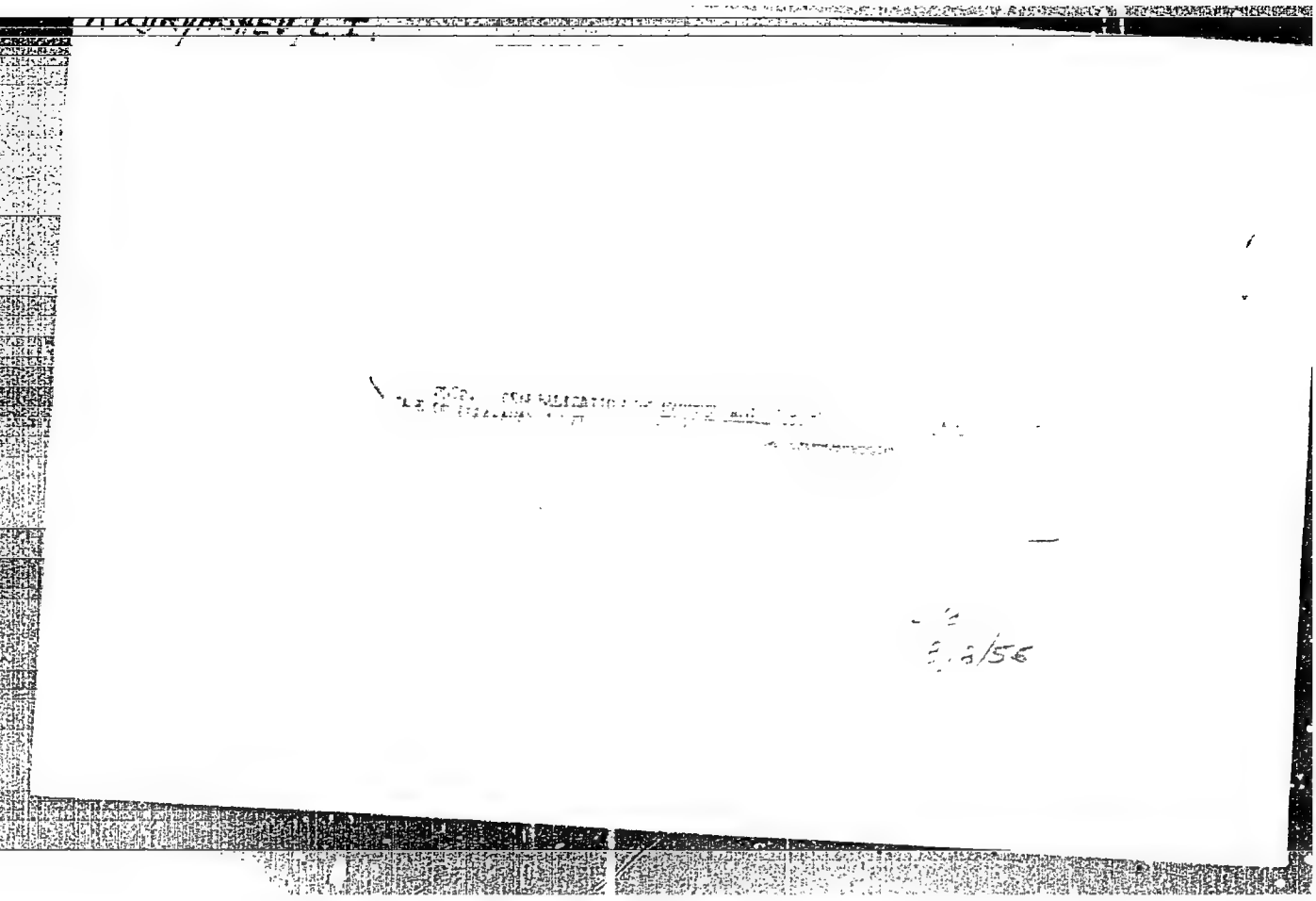
205T27

USSR/Engineering - Heat Engineering, Dec 51
Drying (Contd)

proceeds at expense of internal heat of overheated liquid with const temp of drying gas. Submitted by Acad M. V. Kirpichev.

205T27

KUDRYASHEV, L. I.



KUDRYASHEV, L. I.

May ... October 1953 Vol. 9

Physics

Fr-p

2

42/910 533.6.011.6 :532.526

Heat Exchange in Conditions of Unrestricted Flow of Liquid with a Turbulent Boundary Layer

L. I. Kudryashev

Izv.Akad.Nauk.Otd.Tekh.N. (3),441-449 1953 U.S.S.R.

(1)

The problem is based on a simplified hydrodynamic theory of heat exchange. It is suggested that while considering the thermal process an imaginary boundary layer should be taken into account. The thickness of this layer is assumed to be half of the factual boundary layer. This leads to the conclusion that on the outer boundary of the imaginary turbulent layer temperature of the medium is equal to that prevailing at some considerable distance. This simplificat facilitated the solution, although semi-empirical, of the problem of heat exchange for the most widely used configurat of heat emitting surfaces and arbitrary heat receiving mediu Negligible dependance of Nu on the form of the body supports theoretically earlier inferences on this subject.(Bibl.7)

8/11/54

B. T. A.
V. 3 No. 3
Mar. 1954
Fluid Mechanics

3311* Generalized Energy Form of the Integral Relation in the Theory of the Boundary Layer. (Russian.) L. I. Kudriashev. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1953, no. 10, Oct., p. 1410-1413.
Shows that Isobe's momentum and thermal equations are special cases. Graph.

Abst Journal: Referat Zhur - Mekhanika, No 2, 1957, 2001

Author: Kudryashev, L. I.

Institution: None

Title: Generalization of the Hydrodynamic Theory of Heat Exchange to the Case of Flow Around Bodies of Arbitrary Form

Original Periodical: Tr. Kuybyshevsk. aviats. in-ta, 1954, No 2, 16-25

Abstract: From an analysis of the heat content of a stream of liquid between 2 sections in front of and far behind the shape about which the flow takes place, the following relationship is derived $N = \frac{C}{2} \frac{F_1}{F_0} Pk$

where N is the Nusselt number, P the Peclet number, C is the general resistance coefficient of the body, including both the friction resistance and the shape resistance, F_0 the total surface area of the body about which the flow takes place, F_1 the area of the midship section, and k the ratio of the heat-content losses in the heat trail to the thickness of momentum loss in the hydrodynamic trail.

Card 1/2

Abst Journal: Referat Zhur - Mekhanika, No 2, 1957, 2001

Abstract: This relationship generalizes the known equation from the theory of hydrodynamic heat exchange to the case of flow around a body of general shape with discontinuities in the streamlines.

It is shown that k remains constant over the entire trail far away from the body about which the flow takes place.

Card 2/2

SOV/124-58-1-376

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 1, p 45 (USSR)

AUTHORS: Kudryashov, L. I., Erlikhman, A. M.

TITLE: Hydrodynamic Investigation of the Motion of a Gas in a Vertical Cylindrical Tower of Circular Cross Section in the Presence of a Twisting Velocity in the Gas Flow (Gidrodinamicheskoye issledovaniye dvizheniya gaza v vertikal'noy tsilindricheskoy bashnye krugloga secheniya pri nalichii skorosti zakruchivaniya v gazovom potoke)

PERIODICAL: Sb. nauch. tr. Kuybyshevsk. industr. in-ta, 1955, Nr 5, pp 148-159

ABSTRACT: The author performed a hydrodynamic investigation of the motion of a twisting gas flow in a circular vertical cylindrical tower. The physical flow pattern is clarified. The tower contains a rarefaction zone in its axial portion and a zone of higher pressure along the wall. The location of the separation surface between the two zones depends on the Euler number. The authors have established that the influence of the wall and the finite height of the tower leads to a blurring of the rarefaction zone and a simultaneous reduction of the magnitude of the absolute rarefaction. With a ratio <0.1 between the radius and the

Card 1/2

Hydrodynamic Investigation of the Motion of a Gas in a Vertical (cont.)

height of the tower this influence is virtually nil. The equations obtained can be used for the design calculation of circular vortex-tower furnaces.

Yu. A. Lashkov

Kudryashev, L. I

Abst Journal: Referat Zhur - Mekhanika, No 3, 1957, 3200

Author: Kudryashev, L. I., Vishnevskiy, K. P.

Institution: None

Title: On the Calculation of the Coefficient of Convective Heat Exchange During Condensation of Steam on Vibrating Tubes

Original Periodical: Sb. nauch. tr. Kuybyshevsk. industr. in-ta, 1955, No 5, 160-165

Abstract: Derivation of a semiempirical criterial equation for the Nusselt number for heat exchange during condensation of steam on vibrating horizontal tubes.

Card 1/1

Subject : USSR/Engineering AID P - 3989

[redacted] Pub. 28 - 7/11

Authors : Kudryashev, L. I., Uvarov, G. A. and Erlikhman, A. M.

Title : Arrangement of two-stage evaporation with auxiliary cylinders for boilers of small capacity.

Periodical : Energ. byul., 12, 21-23, D 1955

Abstract : To improve the quality of steam and to reduce the number of blowing-outs in small-size boilers, a two-stage evaporation arrangement with auxiliary cylinders, consisting of a system of tubing attached to the upper and lower collectors and installed in the combustion chamber, was designed. The authors describe the construction, operation, and testing of the ShB A7 and ShB A3 (Shukhov-Berlin) boilers with this double-sided baffle as the second stage of evaporation. Steam production was reportedly improved by 25 to 30%. Two drawings.

SOV/124-58-8-8910

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 8, p 84 (USSR)

AUTHOR: Kudryashev, L.I.

TITLE: Using the Theory of Similarity to Construct Approximate Analytical Solutions for Problems of Hydromechanics and Heat Transfer (Teoriya podobiya kak metod postroyeniya priblizhennogo analiticheskogo resheniya zadach gidromekhaniki i teploobmena)

PERIODICAL: Sb. nauchn. tr. Kuybyshevsk. industr. in-t, 1956, Nr 6, book 1, pp 157-177

ABSTRACT: By comparing the equations of motion with those for the energy in the case of a viscous incompressible fluid the author is able to evolve expressions which interrelate the friction and the heat transfer, such as

$$q_o = c_p g (t_f - t_w) \tau_o / w_o$$

wherein q_o is the specific rate of heat flow, c_p the specific heat, $(t_f - t_w)$ the difference between the temperature of the

Card 1/2

Using the Theory of Similarity (cont.)

fluid flow and the temperature of the wall, w_o the flow velocity, and τ_o the coefficient of friction. An examination is made of criterional relationships which can be used to determine the heat-transfer coefficients on the surface of a plate and inside a conduit for the two cases in which the fluid flows either freely or under pressure. Bibliography: 19 references.

V.S. Avduyevskiy

SOV/124-58-4-4317

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 4, p 90 (USSR)

AUTHORS: Kudryashev, L. I., Erlikhman, A. M.

TITLE: Problems of the Hydrodynamics of a Vertical Cylindrical Combustion Chamber (Vortex Furnace) [Voprosy gidrodinamiki vertikal'noy tsilindricheskoy bashni (vikhrevoy topki)]

PERIODICAL: Sb. nauchn. tr. Kuybyshevsk industr. in-ta, 1956, Nr 6, book 1, pp 195-198

ABSTRACT: The article describes further experiments of the authors related to the motion of pulverized fuel in a vertical cylindrical furnace (ref. Sb. nauchn. tr. Kuybyshevsk. industr. in-ta, 1955, Nr 5, pp 148-159; RZhMekh, 1958, Nr 1, abstract 376). Equations are given for the motion of a pulverized fuel particle due to the action of gravitational and centrifugal forces, as well as the force imparted to the particle by the rotating gas stream. Equations are given for the relative velocity of a fuel particle, and for the selection of the air inlet angle into the vertical vortex furnace.

1. Combustion chambers--Hydrodynamic characteristics

Card 1/1

I. A. Shepelev

SOV/124-58-2-1964

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 2, p 63 (USSR)

AUTHORS: Kudryashev, L. I., Teverovskiy, B. M.

TITLE: On Some New Forms of Generalized Integral Relationships for the Hydrodynamic and Thermal Boundary Layer (O nekotorykh novykh formakh obobshchennykh integral'nykh sootnosheniy dlya gidrodinamicheskogo i teplovogo pogranichnogo sloya)

PERIODICAL: Tr. Kuybyshevsk. aviats. in-ta, 1957, Nr 3, pp 3-9

ABSTRACT: An integral relationship is derived for the transient flow in an axisymmetrical boundary layer; the relationship is analogous to that set forth by Faynzil'ber for the plane case, which is but a generalization of the well-known integral relationship of von Karman. An analogous integral relationship is also derived for the thermal boundary layer.

B. N. Rumyantsev

Card 1/1

83790
S/124/60/000/008/006/011
A005/A001

10 6120

Translation from: Referativnyy zhurnal, Mekhanika, 1960, No. 8, p. 92, # 10396

AUTHOR: Kudryashev, L. I.

TITLE: On the Problem of the Transition from the Laminar to the Turbulent Motion

PERIODICAL: Sb. nauchn. tr. Kuybushevsk. industr. in-ta, 1957, No. 7, pp. 15-23

TEXT: The problem of the transition of the laminar liquid motion into the turbulent motion is usually reduced to the analysis of the stability of the laminar form of flow with respect to small disturbances. The author remarks that the question on the origination of the disturbances mentioned is not considered in most cases when analyzing the stability, and raises "the problem of approximate investigation of the nature of pulsation origination in a steady laminar motion of a liquid from the standpoint of the applicability of the Stokes solution to real compressible liquids". Reviewer's note: The author's conclusions are based on the trivial analysis of the equations of motion and continuity for the flow of incompressible and compressible liquids in a pipe.

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83790

S/124/60/000/008/006/011
A005/A001

On the Problem of the Transition from the Laminar to the Turbulent Motion

The present work has not relation in its essence, with the analysis of the "nature of pulsation origination", since the author silently makes the unfounded supposition as though the loss of the steadiness in a laminar motion in a long pipe occurs in such cases, when, besides the axial component of speed, the two other components are also different from zero (as an example, for a compressible liquid). To say nothing of the fact that an arbitrary three-dimensional motion of liquid can not be assumed as a priori unsteady (as the author erroneously supposes), it must be stated that, as known, the main influence on the motion stability in a flow along a plane channel shows only the component of the speed, which is parallel to the wall of the channel.

O. V. Yakovlevskiy

Translator's note: This is the full translation of the original Russian abstract.

Card 2/2

S/124/61/000/011/021/046
D237/D305

AUTHOR: Kudryashev, L.I.

TITLE: On new possibilities of applying the similarity theory to solving problems of hydromechanics and heat exchange

PERIODICAL: Referativnyy zhurnal, Mekhanika, no. 11, 1961, 87, abstract 11B580 (Sb. nauchn. tr. Kuybyshevsk. industr. in-ta, 1957, no. 7, 25 - 31)

TEXT: The application of the theory of similarity to an approximate analytical solution of hydromechanical and heat exchange problems is considered. The method is used to solve the Stokes-Poiseuille problem of the motion of incompressible fluid in a horizontal round tube, and the problem of heat exchange in a straight round tube in the region of hydraulic and thermal stabilization of the laminar motion of the fluid. A solution of the heat exchange problem was obtained with and without taking into account the transverse temperature gradient. In the latter case, the following equation was established: $N = (6\frac{1}{3})(N/P^2)$. [Abstractor's note: Comple-

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On new possibilities of applying ... S/124/61/000/011/021/046
te translation]. D237/D305

Card 2/2

S/124/60/000/003/013/017
A005/A001

Translation from: Referativnyy zhurnal, Mekhanika, 1960, No. 3, p. 79, # 3472

AUTHORS: Kudryashev, L. I., Vishnevskiy, K. P.

TITLE: On the Theoretical Substantiation of the Calculation Equation for the Convective Heat-Exchange Coefficient at Turbulent Motion Under Internal-Problem Conditions

PERIODICAL: Sb. nauchn. tr. Kuybyshevsk industr. in-ta, 1957, No. 7, pp. 33-40

TEXT: The authors attempt to substantiate the known empiric exponential formula of the interconnection between the Nusselt number and the Reynolds- and Prandtl-numbers, using the early "two-layer" Prandtl scheme (laminar sublayer, turbulent layer). Exponential formulae with the same power exponent, equal to the arithmetic mean from the known empirical exponents 1/6 and 1/10 are used for the velocity- and temperature patterns in the turbulent layer. The conventional empirical exponential formula is also used for the resistance coefficient. Using these empirical data and basing also on the impulse- and thermal-balance formulae, the authors set up their theoretical construction. The authors do not

Card 1/2

3/124/60/000/003/013/017
A005/A001

On the Theoretical Substantiation of the Calculation Equation for the Covective Heat-Exchange Coefficient at Turbulent Motion Under Internal-Problem Conditions

B

mention the limits of the Prandtl number values, for which they assume their conclusion to be true. At the other hand, it is known that the two-layer scheme is not justified for large Prandtl numbers and must be replaced by a more rigorous scheme, which is the three-layer scheme (laminar layer, intermediate zone, turbulent layer) established by Karman in the thirties.

L. G. Loytsyanskiy

Card 2/2

8(6) SOV/112-57-4-6535

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1959, Nr 4, p 18 (USSR)

AUTHOR: Kudryashev, L. I., and Vishnevskiy, K. P.

TITLE: Theoretical Basis for the Selection of the Determining Temperature and Equivalent Diameter in Computing the Heat-Transfer Factor for Turbulent Motion of a Liquid in a Pipe

PERIODICAL: Sb. nauchn. tr. Kuybyshevsk. industr. in-ta, 1957, Nr 7, pp 41-45

ABSTRACT: A theoretical basis is given to the suggestion of Academician M. A. Mikheyev, which is: the average liquid temperature is assumed to be the determining temperature, and the equivalent diameter is assumed to be the determining dimension; this diameter is equal to the quadrupled cross-section area divided by the entire (wetted) perimeter of the cross-section, disregarding the fact that only a part of the perimeter plays a role in the heat transfer. To provide proof, a balance of energies passing through an element to the surface that limits the region in question is compiled. To calculate the thickness of the

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Theoretical Basis for the Selection of the Determining Temperature and . . . .

boundary hydrodynamic layer, the balance between the pressure drop in the pipe cross-section and the shearing stress applied at the average-stream boundary is considered. A mathematical expression of this balance, after some transformations, results in an equation of the heat-transfer hydrodynamic theory; this demonstrates the close association of the hydrodynamic theory and the boundary-layer theory, on the one hand, with the problem of selecting the determining temperature and equivalent diameter, on the other.

M.N.N.

SOV/124-59-1-534

Translation from: Referativnyy zhurnal. Mekhanika, 1959, Nr 1, p 76 (USSR)

AUTHORS: Kudryashev, L.I. and Vvedenskaya, L.A.

TITLE: The Regular and the Limited-Regular Temperature Conditions and Their Application to the Experimental Determinations of the Coefficient of Heat-Transfer and of the Resistance to the Heating of Bodies of Arbitrary Shape

PERIODICAL: Sb. nauchn. tr. Kuybyshevsk. industr. in-ta, 1957, Nr 7, pp 47-59

ABSTRACT: The evaluation of the influence of the non-steadiness of a temperature field on the heat-transfer is performed for the case of introducing an α-calorimeter into the stream of a viscous incompressible liquid. By the method of regular temperature-process, the heat-transfer of tubes with circular, square and triangular cross-section blown off by an air-jet in a wind tunnel at the Reynolds number $R = 10^3 \ldots 4 \times 10^4$ has been investigated. It was found that the deflection angle of the tube relative to the direction of the flowing stream does not affect the average coefficient of heat-transfer. Making use of previously obtained expressions (Kudryashev, L.I., Izv. AS USSR, Otd. tekhn. n., 1953, Nr 9, pp 1309-1316) for the relation between the coefficients of resistance and heat-exchange, for the

Card 1/2

The Regular and the Limited-Regular Temperature Conditions and Their Application to the Experimental Determinations of the Coefficient of Heat-Transfer and of the Resistance to the Heating of Bodies of Arbitrary Shape

case of the stream along a body and with separation of the jet, the authors have determined the coefficients of resistance for the same tubes. The obtained results are in accordance with other known treatments and are represented by means of the relations $N = N(R)$ and $c_f = c_f(R)$.

N.A. Anfimov

KUDRYASHEV, L.I., doktor tekhn. nauk, prof.; SYCHEV, M.Ya., inzh.

Specifying the hydraulic design of high-pressure gas pipes under isothermic-gas-flow conditions. Izv.vys. ucheb. zav.; energ. no.4:76-80 Ap '58. (MIRA 11:6)

1. Kuybyshevskiy industrial'nyy institut imeni V.V. Kuybysheva (for Kudryashev). 2. Kuybyshevskiy aviatsionnyy institut (for Sychev).
(Gas flow) (Gas pipes)

KUDRYASHEV, L.I., doktor tekhn.nauk, prof.; SHESTAKOV, B.I., dots.

Method of calculating heat transfer in furnaces. Izv. vys.ucheb.zav.; energ. no.6:75-79 Je '58. (MIRA 11:9)

1.Kuybyshevskiy industrial'nyy institut im. V.V. Kuybysheva.
(Heat--Transmission) (Furnaces)

66207

~~24(8)~~ 24.5200 SOV/146-58-6-13/16

AUTHORSL Kudryashev, L.I., Doctor of Technical Sciences, Professor, and Zhemkov, L.N. Aspirant

TITLE: Generalization of Regular Heat Condition in the Case of Variable Heat-Capacity and Heat-Conductivity Coefficients

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Priborostroyeniye, 1958, Nr 6, pp 100-108 (USSR)

ABSTRACT: Theoretical methods of establishing regular heat conditions are of late widely used in different thermal computations. This was shown with complete clarity at the 1st Inter-University Conference held in March, 1958. Thus far, the theory of heat regularity was based on the assumption of constancy of thermophysical properties of a given substance. The authors of this article consider the problem from a different angle, namely, they generalize the above theory by admitting the variability of the heat-capacity and heat-conductivity coefficients. For this purpose, a new integral function:

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SOV/146-58-6-13/16

Generalization of Regular Heat Condition in the Case of Variable Heat-Capacity and Heat-Conductivity Coefficients

$\Phi = \int_0^\tau \frac{\lambda}{c\rho} d\tau$, instead of temperature t, and a new argument $\xi = \int_0^\tau a d\tau$ instead of time τ have been introduced.

These new formulae permit solution of the problem of linearization of non-linear differential equations that express the process of heat exchange. The authors analyze two cases: 1) there are no internal sources of heat in the body; and 2) there are certain internal sources generating heat present in the body. Experimental research of the new theory was performed assuming a strong variability of thermophysical properties of researched substance. To this end, graphite, on account of its considerable change-ability of heat-conductivity depending on temperature, was selected. The theory of temperature regularity, as expounded at one time by G.M. Kondrat'yev, represents a particular case of the theory considered in this article.

Card 2/3

66207

SOV/146-58-6-13/16

Generalization of Regular Heat Condition in the Case of Variable Heat-Capacity and Heat-Conductivity Coefficients

There are 2 graphs and 7 Soviet references.

ASSOCIATION: Kuybyshevskiy industrial'nyi institut imeni V.V. Kuybysheva (Kuybyshev Industrial Institute imeni V.V. Kuybyshev)

SUBMITTED: December 20, 1958

Card 3/3

KUDRYASHOV, L.I.; TEMNIKOV, A.V.

Generalized theory of regular thermal conditions applied to variable thermophysical characteristics. Inzh.-fiz.zhur. no.10:101-105 O '58. (MIRA 11:11)

1. Industrial'nyy institut imeni V.V.Kuybysheva, g.Kuybyshev.
(Heat--Transmission)

KUDRYASHEV, L.I.; SYCHEV, M.Ya.

Theory of calculating gas dynamics for gas pipelines. Izv. vys. ucheb. zav.; neft' i gaz 2 no.6:117-124 '59.
(MIRA 12:10)

1.Kuybyshevskiy industrial'nyy institut im. V.V. Kuybysheva, Kuybyshevskiy aviatsionnyy institut.
(Gas, Natural--Pipelines)

KUDRYASHEV, L.I.; SYCHEV, M.Ya.

More on the problem of refining the hydraulic calculations of high pressure main gas pipelines under isothermic-gas-flow conditions. Izv. vys. uchab. zav.; energ. 2 no.7:115-124 Jl '59. (MIRA 13:1)

1.Kuybyshevskiy industrial'nyy institut im. V.V. Kuybysheva (for Kudryashev). 2.Kubyshevskiy aviatsionnyy institut (for Sychev).
(Gas, Natural--Pipelines)

KUDRYASHEV, L.I.; TSERERIN, V.A.

Effect of nonisothermal flow on the coefficient of hydraulic resistance in gas pipelines. Izv. vys. ucheb. zav.; neft' i gaz 2 no.10:103-110 '59. (MIRA 13:2)

1.Kuybyshevskiy industrial'nyy institut im. V.V. Kuybysheva.
(Gas, Natural--Pipelines)

24(8)

SOV/170-59-4-10/20

AUTHORS: Kudryashev, L.I., Zhemkov, L.I.

TITLE: A Generalized Theory of Regular Thermal Behavior for the Case of Variable Thermophysical Characteristics (Obobshcheniye teorii regulyarnogo teplovogo rezhima na sluchay peremennykh teplofizicheskikh kharakteristik)

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1959, Nr 4, pp 72-77 (USSR)

ABSTRACT: The case when thermal sources and outlets exist in a body is described by a system of non-linear differential equations which do not possess the property of regularity. The problem of their linearization is solved by the authors by means of introducing a new thermodynamic potential ϕ instead of temperature t and an integral argument ξ instead of time τ. The performance of this transformation leads to a linear differential equation

$$\frac{\partial \phi}{\partial \xi} = \nabla^2 \phi + q_v$$

where q_v is the intensity of thermal sources or outlets. Therefore the Fourier method of solving this equation in the form of a product of two independent functions is applicable to this case. This furnishes the possibility of generalizing the theory

Card 1/3

A Generalized Theory of Regular Thermal Behavior for the Case of Variable Thermophysical Characteristics

of thermal regularity to the case of variable thermophysical properties. It turned out that Kondrat'yev's theory of regular thermal behavior is a particular case of the present generalized theory. Expressions are found for the rate m_ξ and coefficient of irregularity of the field Ψ_ξ, both for the case of heat transfer without inner sources of heat and with them. Various cases of the relationship between the intensity of heat transfer and sources of heat are analyzed graphically. A single-valued relationship is found between the intensity of heat transfer and heat m_ξ in the case of variable coefficients of heat conductivity and heat capacity. A series of experiments were carried out in an aerodynamical tube by blowing the air over cylindrical calorimeters which had been pre-heated. Calorimeters were made of graphite and steel, and experiments were performed in the Re-range from 1,000 to 50,000. They confirmed that there exists a regular relationship between the function Φ and the argument ξ and showed that the generalized theory proposed could be recommended for practical calculations of non-stationary thermal

SOV/170-59-4-10/20

A Generalized Theory of Regular Thermal Behavior for the Case of Variable Thermophysical Characteristics

processes for substances with variable thermophysical characteristics.
There are 7 Soviet references.

ASSOCIATION: Industrial'nyy institut (Industrial Institute), Kuybyshev

Card 3/3

05271
SOV/170-59-7-2/20

24(8)

AUTHORS: Zhemkov, L.I., Kudryashov, L.I.

TITLE: A Generalization of G.M. Kondrat'yev's Theorem for the Case of Variable Thermo-Physical Characteristics

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1959, Nr 7, pp 8 - 12 (USSR)

ABSTRACT: The theorem of G.M. Kondrat'yev, occupying a central place in the theory of regular temperature conditions, was proven only for the case of λ = const and c_p = const. On the basis of their previous paper [Ref 3] in which the authors linearized Fourier's non-linear differential equation of conductivity, they generalized the theory of thermal regularity for the case of variable thermo-physical characteristics, thereby proving the first part of Kondrat'yev's theorem for this generalized case. In the present paper they generalize the second part of Kondrat'yev's theorem on the limiting value of the rate $m\varphi$ at the infinite value of heat exchange coefficient on the surface of a body. The authors found that this limiting value of temperature conductivity coefficient depends only on a factor introduced by Kondrat'yev [Ref 1], which was named the coefficient K of the shape of a body, Formula 4. Formula 10 shows that the limiting rate of temperature changing with time varies in the same way as does the

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05271
307/170-59-7-2/20

A Generalization of G.M. Kondrat'yev's Theorem for the Case of Variable Thermo-Physical Characteristics

coefficient of temperature conductivity. Kondrat'yev's theorem is generalized for any value of the heat transfer coefficient. It makes possible to study thermal properties of substances and to determine the coefficient of temperature conductivity a.
There are 2 Soviet references.

ASSOCIATION: Industrial'nyy institut (Industrial Institute), Kuybyshev.

Card 2/2

32262
S/612/59/000/008/001/016
D216/D304

24.5200

AUTHORS: Kudryashev, L. I., Doctor of Technical Sciences, Professor, and Chemkov, L. I. Aspirant

TITLE: The generalized theory of the regular thermal regime for the case of varying coefficients of thermal conductivity and specific heat

SOURCE: Kuybyshev. Industrial'nyy institut. Sbornik nauchnykh trudov, No. 8, 1959. Teplotekhnika; voprosy teorii, rascheta i proyektirovaniya, 3-17

TEXT: This paper presents a theoretical solution of the title problem and gives an experimental check of the results. When the coefficients of thermal conductivity λ and specific heat C_p vary with temperature, the differential equation of thermal conductivity becomes non-linear, and the first problem tackled is its linearization. Consider non-stationary heating or cooling of a body, volume V with heat-exchanging surface F. For an isobaric process, the energy balance equation may be written

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The generalized theory ...

$$\int_V q_v dV = \frac{\partial}{\partial \tau} \int_V \gamma i dV + \int_F q_n dF \qquad (1)$$

where q_v is the intensity of the internal heat source per unit volume q_n the thermal current vector, γ the specific gravity, i the enthalpy, and τ the time variable. The authors choose to limit Eq. (1) with the equation of conservation of mass, since it formulates the problem in a more general form. From this condition, Ostrogradskiy's theorem

$$\int_F q_n dF = \int_V \mathrm{div} q_n \, dV \qquad (4)$$

and Fourier's hypothesis

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$$q_n = -\lambda \, \text{grad } t \qquad (5)$$

and expressing i as a function of C_p and temperature t, (1) may be rewritten as

$$\gamma C_p \frac{\partial t}{\partial \tau} = \text{div}(\lambda \, \text{grad } t) + q_v \qquad (10)$$

The initial condition

$$\tau = 0 \qquad t = t_0(x,y,z) \qquad (12a)$$

and the condition that cooling proceeds by Newton's law must be remembered. When λ and C_p are temperature dependent, (10) with the

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conditions becomes non-linear, and a new function $\Phi = \int_0^i \frac{\lambda}{C_p} di$ is introduced in place of temperature τ and a new integral argument $\xi = \int_0^\tau \frac{\lambda}{C_p \delta} d\tau$ in place of time τ. Relations

$$a) \quad \text{grad } i = C_p \cdot \text{grad } t \tag{13}$$

$$b) \quad \text{div}(\lambda \text{grad } t) = \nabla^2 \Phi \tag{14}$$

are established, and (10) now becomes

$$\frac{\partial \Phi}{\partial \xi} = \nabla^2 \Phi + q_v \tag{24}$$

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and the linearization is achieved. Now consider the case $q_v = 0$, when the solution of (24) may be written

$$\Phi(\xi, x, y, z,) = \varphi(\xi)\Psi(x, y, z) \tag{25}$$

and (14) becomes

$$\frac{\varphi'(\xi)}{\varphi(\xi)} = \frac{\nabla^2\Psi(x, y, z)}{\Psi(x, y, z)} \tag{26}$$

satisfying the Fourier condition for the function. Thus the relationship between the new functions introduced for the linearization of the thermal conductivity equation shows the property of regularity. Next, the deformation of the temperature field due to variation of λ and C_p is considered. From (14) and (24), with $q_v=0$, using (4) and applying Newton's law of cooling

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$$\frac{1}{\Phi_V} \cdot \left(\frac{\partial \Phi}{\partial \xi}\right)_V = -\frac{\alpha_w t_u F}{V \cdot \Phi_V} \qquad (30)$$

where α is the coefficient of thermal emission, and the subscripts v and w refer to the mean value of the parameter through the volume and its value at the surface of the body respectively. Eq. (25) expresses the constancy of the left-hand side of this equation, which is denoted as the rate of change of Φ with ξ, m_Φ. This function is analogous to the rate m_v for excess temperature in G. M. Kondrat'yev's theory. Integrating

$$m_\Phi = \frac{\ln \Phi_1 - \ln \Phi_2}{\xi_2 - \xi_1} \qquad (34)$$

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Thus, the rate of change of $\underline{\Phi}$ with time, $m'_{\underline{\Phi}}$, is related to $m_{\underline{\Phi}}$ by

$$m'_{\underline{\Phi}} = \left(\frac{\lambda}{c_p \gamma}\right)_m \cdot m_{\underline{\Phi}} \qquad (38)$$

where the subscript m refers to the mean value through the studied interval of time, and the coefficient of inequality of the temperature field ψ is given by

$$\psi = \frac{\lambda_v t_w}{\underline{\Phi}_v} \qquad (40)$$

This differs from the value obtained in the temperature regular regime. Evidently, the similarity of the equations shows that the temperature regular regime theory is a particular example of the generalized theory of the regular thermal regime. Experimental tests of the theory were made using materials with strongly temperature-

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dependent thermophysical properties - graphite and steel 3, in the form of a cylinder 50 mm diameter, 400 mm long. 4 thermocouples gave an approximate picture of the temperature distribution in the sample, and their disposal relative to the current of cooling air, the velocity of this current, and the temperature to which the sample was initially heated were all varied. The results indicate that the introduction of the function $\overline{\Phi}$ took account of temperature dependence of the properties of the coolant as well as of the specimen . The rate m_v did not remain constant during an experiment, $m'_{\overline{\Phi}}$ was also not constant but varied much less, and finally $m_{\overline{\Phi}}$ was constant over all ranges of ξ studied, and was also the same at all points observed on the sample. The results completely confirm the theory for all values of Reynolds' number of the coolant from 1,000 - 50,000. Conclusions: Substitution of a new thermodynamic potential $\overline{\Phi}$ in place of temperature, and a new integral argument ξ in place of time permit linearization of the differential equation of thermal conductivity, and hence a generalized theory of the regular

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thermal regime for varying coefficients of thermal conductivity and specific heat is constructed. An equation for the rate m_ϕ is obtained and a generalized conception of the coefficient of inequality of the temperature field is established. A practical test of the theory gives positive results. There are 8 Soviet-bloc references.

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